

I Claim:

1. A rotary engine comprising:
  - a combustion chamber;
  - an expansion chamber in intermittent communication with the combustion chamber
  - a rotor disposed within the expansion chamber, the rotor being driven by the expansion of combustion gases from within the combustion chamber into the expansion chamber;
  - a compressor operably driven by said rotor to compress atmospheric pressure air and to force the compressed air into the combustion chamber;
  - the combustion chamber comprising
    - an enclosure,
    - a check valve between the compressor and the combustion chamber to control the entry of compressed air from the compressor into the combustion chamber, and
    - a pass gate sentry valve located between the combustion chamber and the expansion chamber to intermittently permit the exit of expanding combustion gases from the combustion chamber into the expansion chamber.
2. The rotary engine of Claim 1, wherein the pass gate sentry valve comprises a valve shiftable from an open orientation to a closed orientation and biased toward a closed orientation by a biasing force, and having a portion acted upon by the pressure of combustion gases from the combustion chamber such that when the pressure of combustion gases reaches a predetermined value an opposing force created overcomes the biasing force and the pass gate sentry valve shifts from an open orientation to a closed orientation thereby permitting the combustion gases to expand into the expansion chamber.

3. The rotary engine of Claim 1, wherein the pass gate sentry valve comprises a valve shiftable from an open orientation to a closed orientation and biased toward a closed orientation by a spring, and the valve further comprising a partially hemispherical valve body engageable to a valve seat and a piston in a cylinder, the cylinder being in fluid communication with the combustion chamber such that expanding gases from the combustion chamber act upon the piston and overcome the bias of the spring to move the valve body away from the valve seat.
4. The rotary engine of Claim 1, further comprising a glow plug at least partially contained within the enclosure.
5. The rotary engine of Claim 1, further comprising a spark plug at least partially contained within the enclosure.
6. The rotary engine of Claim 1, the compressor comprising a rotary compressor.
7. The rotary engine of Claim 1, the compressor comprising a rotary compressor coaxially driven by the rotor.
8. The rotary engine of Claim 1, the compressor comprising a rotary compressor coaxially driven by the rotor via a shaft, the compressor further comprising a reed valve separating the compressor from the check valve.
9. The rotary engine of Claim 1, the combustion chamber further comprising a fuel injector to inject a metered quantity of fuel into the combustion chamber.
10. The rotary engine of Claim 1, wherein the check valve is a poppet valve.

11. A combustion chamber for use with a rotary engine, the combustion chamber comprising:
  - an enclosure;
  - a coolant injector to inject a metered quantity of coolant into the combustion chamber;
  - a check valve in a passage to control the entry of compressed air into the combustion chamber; and
  - a pass gate sentry valve located in a passage to intermittently permit the exit of expanding combustion gases from the combustion chamber into the expansion chamber.
12. The combustion chamber of Claim 11, further comprising a glow plug at least partially contained within the enclosure.
13. The combustion chamber of Claim 11, further comprising a spark plug at least partially contained within the enclosure.
14. The combustion chamber of Claim 11, further comprising a fuel injector to inject a metered quantity of fuel into the combustion chamber.
15. The combustion chamber of Claim 11, wherein the pass gate sentry valve comprises a valve shiftable from a closed orientation to an open orientation and biased toward a closed orientation by a biasing force, and having a portion acted upon by the pressure of combustion gases from the combustion chamber such that when the pressure of combustion gases reaches a predetermined level an opposing force created overcomes the biasing force and the pass gate sentry valve shifts from an open orientation to a closed orientation thereby permitting the combustion gases to expand outwardly from the combustion chamber chamber.

16. The combustion chamber of Claim 11, wherein the pass gate sentry valve comprises a valve shiftable from an closed orientation to a open orientation and biased toward a closed orientation by a spring, and the valve further comprising a partially hemispherical valve body engageable to a valve seat and a piston in a cylinder the cylinder being in fluid communication with the combustion chamber such that expanding gases from the combustion chamber act upon the piston and overcome the bias of the spring to move the valve body away from the valve seat when pressure within the combustion chamber reaches a predetermined level.

17. A method of controlling the flow of expanding combustion gases beyond the confines of a combustion chamber, the method comprising:

closing an aperture in a wall of the combustion chamber by engaging a pass gate sentry valve having a valve body against a valve seat circumscribing the aperture;

biasing the pass gate sentry valve toward the valve seat with a predetermined biasing force;

placing a piston operably coupled to the pass gate sentry valve in a cylinder;

coupling the cylinder in fluid communication with the combustion chamber such that expanding gases from the combustion chamber act upon the piston and overcome the biasing force to move the valve body away from the valve seat when pressure within the combustion chamber reaches a predetermined level thereby opening the pass gate sentry valve and allowing the combustion gases to expand through the aperture beyond the confines of a combustion chamber.

18. The method of Claim 17, further comprising the step of facilitating ignition of a fuel air mixture to create the combustion gases by placing either a sparkplug or a glow plug at least partially within the combustion chamber.

19. The method of Claim 17, further comprising the step of injecting a metered quantity of coolant into the combustion chamber.